

REMARKS

The Office Action dated July 11, 2007 has been received and carefully noted. The above amendments to the specification and claims, and the following remarks, are submitted as a full and complete response thereto.

Claims 1, 4 and 5 have been amended to more particularly point out and distinctly claim the subject matter of the invention. Claims 2 and 3 have been cancelled without prejudice or disclaimer. No new matter has been added. Claims 6-10 are withdrawn from prosecution. Claims 1, 4 and 5 are submitted for consideration.

The Office Action required that the provisional election of claims 1-5, drawn to a molding machine, be affirmed. Applicants affirm that claims 1-5 are elected for further prosecution and that claims 6-10 are withdrawn from prosecution.

The disclosure is objected to because of informalities. The disclosure has been amended to overcome the objection. Therefore, Applicants request that the objection be withdrawn.

Claims 1-5 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which is the invention. Claim 1 has been amended to overcome the rejection. Therefore, Applicants request that the rejection be withdrawn.

Claims 1-5 were rejected under 35 U.S.C. 102(b) as being anticipated by Japanese Application No. 2003-145600 (hereinafter JP '600). Claims 1-5 were also rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 7,067,078 to Amano

(hereinafter Amano). The rejections are traversed as being based on references that do not teach or suggest each of the elements of the pending claims.

Claim 1, upon which claims 4 and 5 depend, recites a molding machine including an actuator driven by oil supplied thereto and an accumulator disposed along an oil passage for supplying oil to the actuator. The machine also includes a drive pressure sensing section for sensing the drive pressure for driving the actuator and a charge pressure sensing section for sensing the charge pressure of the accumulator. The machine further includes a charge pressure setting processing means which sets the upper limit of the charge pressure on the basis of the pressure difference between the minimum sensed charge pressure of the charge pressure which is sensed and the maximum sensed drive pressure of the drive pressure which is sensed.

As outlined below, JP '600 and Amano do not teach or suggest each of the elements of the pending claims.

JP'600 discloses that an oil pressure control unit of an injection molding machine has an actuator, an oil pressure supply source, an adjusting device for adjusting at least one of the amount and pressure of oil supplied to the actuator and an accumulator. The unit also includes an accumulator pressure detection part for detecting the pressure of the accumulator and an accumulator pressure control part for controlling the pressure of the accumulator. The unit further includes an accumulator pressure judging processing means for judging whether the pressure of the accumulator is sufficiently higher than the pressure of the actuator and an accumulator pressure altering processing part for lowering

a set value when the pressure of the accumulator is sufficiently higher than the pressure of the actuator. See at least the Abstract.

Amano discloses that an injection molding machine includes an actuator supplied oil so as to actuate, an accumulator in which the oil, supplied to the actuator and having an accumulating hydraulic pressure set in a range of designated values, is accumulated. The injection molding machine also includes an accumulating hydraulic pressure determining part configured to determine whether or not the accumulating hydraulic pressure is sufficiently higher than an actuating hydraulic pressure, that is, a hydraulic pressure for actuating the actuator. The injection molding machine further includes an accumulating hydraulic pressure change part configured to reduce a set value of the accumulating hydraulic pressure in a case where the accumulating hydraulic pressure is sufficiently higher than the actuating hydraulic pressure. See at least the Abstract.

Applicants submit that neither JP '600 nor Amano teaches or suggests each of the elements of the pending claims. Claim 1, in part, recites includes a charge pressure setting processing means which sets the upper limit of the charge pressure on the basis of the pressure difference between the minimum sensed charge pressure of the charge pressure which is sensed and the maximum sensed drive pressure of the drive pressure which is sensed. Neither JP '600 nor Amano teaches these features.

In the present invention, in order to drive an injection cylinder 11, oil is supplied to an oil chamber 15. However, the amount of oil discharged from a hydraulic pump 21 is inadequate. Therefore, as recited in the pending claims, the accumulator 35 is disposed

along an oil passage so that oil stored in the accumulator 35 is supplied to the oil chamber 15. In addition, as recited in the pending claims, oil pressure stored in the accumulator 35 (charge pressure CP) is sensed by a charge pressure sensor 36. When a sensed charge pressure CPS is lower than previously determined lower limit CPL, oil is supplied to the accumulator 35. Furthermore, when the sensed charge pressure CPS is higher than previously determined upper limit CPH, oil is drained from the accumulator 35. As a result, the charge pressure CF is controlled. However, when the injection cylinder 11 is driven at low pressure, oil at an unnecessarily high charge pressure CP is stored in the accumulator 35 so that energy consumption ends up increasing. In order to cope with the problem, in the present invention, the upper limit CPH can be changed. Therefore, oil pressure supplied to the oil chamber 15 in the injection cylinder 11 (drive pressure DP) is sensed by a drive pressure sensor 19. A sensed drive pressure DPS and the sensed charge pressure CPS are read and the minimum value of the sensed charge pressure CPS (the minimum sensed charge pressure CPmin) and the maximum value of the sensed drive pressure DPS (the maximum sensed drive pressure DPmax) are obtained by an actual result obtaining processing means of a charge pressure setting processing means. Thus, a differential pressure ΔP between the basis of the minimum sensed charge pressure CPmin and the maximum sensed drive pressure DPmax is determined, thereby the upper limit CPH is set so as to make the differential pressure ΔP equal to a reference pressure α .

Amano describes in Col. 6, lines 63-Col. 7, lines 8, that a first on-setting pressure Pnl (the lower limit) and a first off-setting pressure Pfl (the upper limit) are set so as to

make a charge valve 97 on/off in the normal mode operation and a second on-setting pressure P_{n2} and a second off-setting pressure P_{f2} are set so as to make the charge valve 97 on/off in the energy-saving mode operation. Furthermore, as described in Col. 8, lines 16-61 of Amano, when an injection apparatus drives in the normal mode operation, an accumulating hydraulic pressure (charge pressure) is compared to determine whether the accumulating hydraulic pressure is sufficiently higher than an injection cylinder pressure. When the accumulating hydraulic pressure is sufficiently higher than the injection cylinder pressure, the second on-setting pressure P_{n2} and the second off-setting pressure P_{f2} are set and the charge valve 97 is made on/off in the energy-saving mode operation.

However, in Amano, the second on-setting pressure P_{n2} and the second off-setting pressure P_{f2} are previously set irrespective of actual accumulating hydraulic pressure and injection cylinder pressure. Accordingly, the charge pressure can not become sufficiently low. In addition, whether the accumulating hydraulic pressure is sufficiently higher than the injection cylinder pressure is determined by whether a difference α between the first on-setting pressure P_{n1} and a peak pressure P_p is sufficiently larger than a hysteresis difference $(\beta_1 - \alpha_1)$. Therefore, the difference α becomes a positive value, whereby the second on-setting pressure P_{n2} can not be lower than the Peak pressure P_p of the injection cylinder pressure. In the contrast, in the present invention, the minimum sensed charge pressure CP_{min} can be lower than the maximum sensed drive pressure DP_{max} .

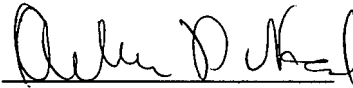
JP '600 also does not teach or suggest a charge pressure setting processing means which sets the upper limit of the charge pressure on the basis of the pressure difference between the minimum sensed charge pressure of the charge pressure which is sensed and the maximum sensed drive pressure of the drive pressure which is sensed. Based on the distinctions noted above, Applicants respectfully requests that the rejections under 35 U.S.C. 102(b) and 102(e) be withdrawn because neither JP '600 nor Amano teaches or suggests each of the elements of claim 1, and hence dependent claims 4 and 5 thereon.

As noted previously, claims 1, 4 and 5 recite subject matter which is neither disclosed nor suggested in the prior art references cited in the Office Action. It is therefore respectfully requested that all of claims 1, 4 and 5 be allowed, and this application passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicants' undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicants respectfully petition for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,



Arlene P. Neal

Registration No. 43,828

Customer No. 32294
SQUIRE, SANDERS & DEMPSEY LLP
14TH Floor
8000 Towers Crescent Drive
Tysons Corner, Virginia 22182-2700
Telephone: 703-720-7800
Fax: 703-720-7802

APN:ksh